

Date: 3/27/2018

The Effects of Scapular Muscle Fatigue on Scapular Sensorimotor System

Author: Guo-Fong Luo

Adviser: Yi-Fen Shih, Ph.D.

Study Protocol

- Objective: To investigate the effect of scapular muscle fatigue on scapulothoracic joint position sense and neuromuscular performance.
- Design: Cross-sectional study design
- Methods: We recruited 30 healthy adults (15 males and 15 females aged 23.6 ± 1.8 years old in average) for the study. They received the measurements of scapulothoracic joint position sense (reposition error) during the elevation and protraction tasks, muscle strength, and scapular kinematics and muscle activation (amplitude and recruitment timing) during scaption (arm elevation in scapular plane) before and after a fatigue protocol. Our fatigue protocol was a task designed to exhaust scapular muscles including upper, lower trapezius, and serratus anterior. The task required the participants holding the modified push-up plus position for two (female) or three (male) minutes for five to ten repetitions or until they could no longer hold the position. The repeated measures analysis of variance (ANOVA) was used to assess the effects of fatigue on scapular reposition errors, muscle strength, scapular kinematics, muscle activation, and recruitment timing. The level of statistical significance was set at $P < 0.05$.

Statistical Analysis Plan

- Two-way repeated measures analysis of variance (ANOVA) for kinematics data and muscle activation during scaption
- Statistical significance for all comparisons at $P < .05$, and adjusted to 0.00625 and 0.0083 using Bonferroni method for post separate one-way repeated measures analysis of variance